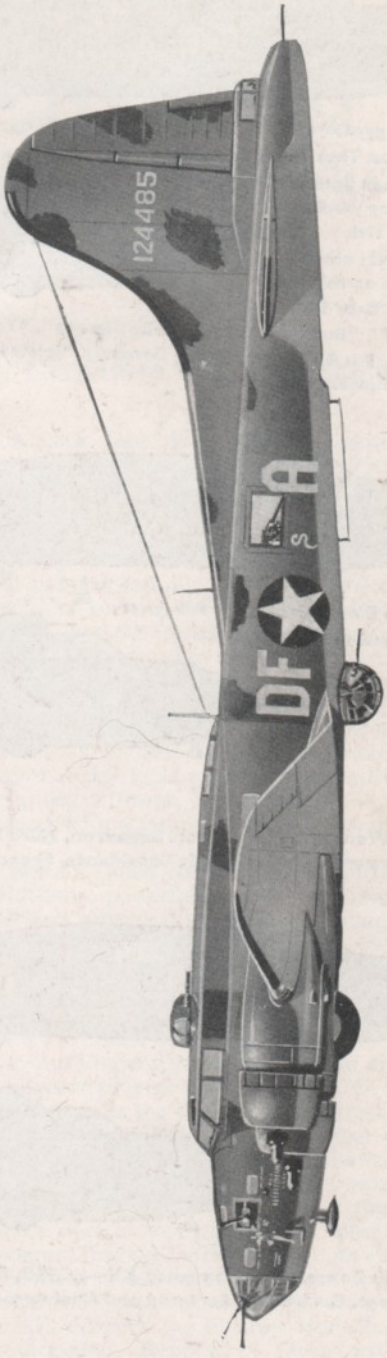
PROFILE PUBLICATIONS

The Boeing B-17E & F Flying Fortress



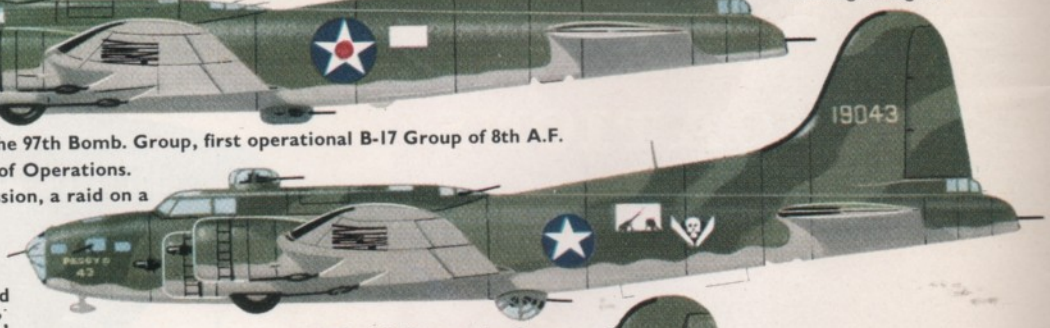
NUMBER 77

TWO SHILLINGS

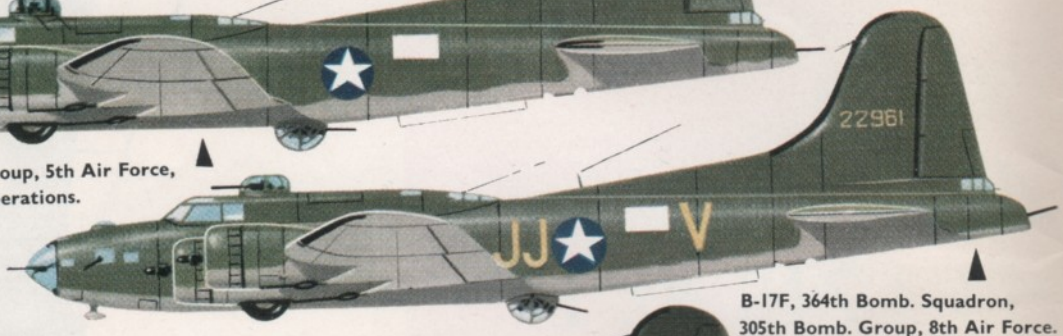
B-17E, 38th or 88th Reconnaissance Squadron. An aircraft of the formation which landed at Hickam Field, Oahu, during the Japanese attack on Pearl Harbour, Hawaii, 7th December 1941. The formation was in transit from Hamilton Field, California, to the Philippines. No serial carried on fin.

Fuselage insignia.

B-17E "Peggy D" of the 97th Bomb. Group, first operational B-17 Group of 8th A.F. in European Theatre of Operations. Took part in first mission, a raid on a marshalling yard at Rouen on 17th August 1942; other Fortresses on this raid included "Baby Doll", "Big Stuff", "Butcher Shop", "Berlin Sleeper", "Yankee Doodle" (carrying Gen. Ira Eaker, 8th A.F. Commanding General), "Johnny Reb" and "Birmingham Blitzkrieg".

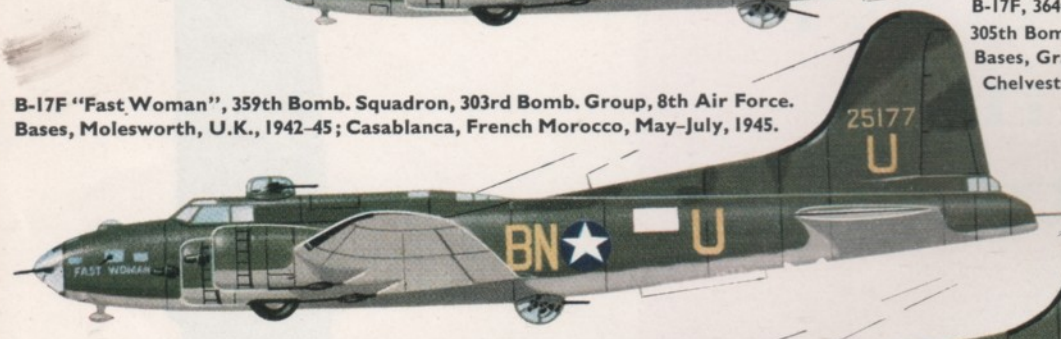


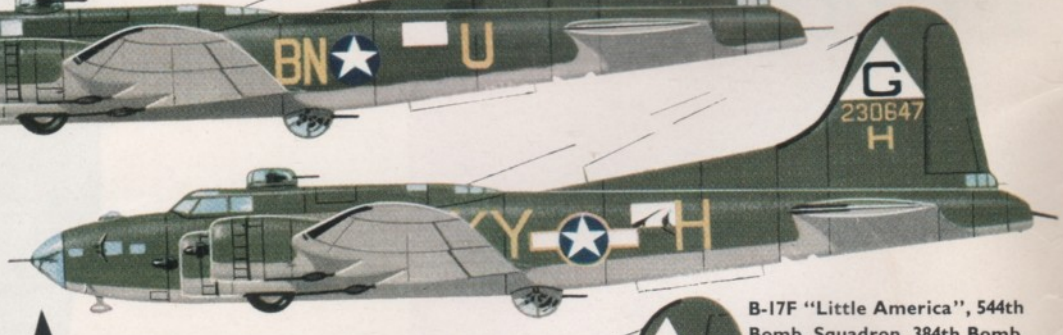
B-17E, 19th Bomb. Group, 5th Air Force, Pacific Theatre of Operations.



B-17F, 364th Bomb. Squadron, 305th Bomb. Group, 8th Air Force. Bases, Grafton Underwood and Chelveston, U.K., 1942–45.

B-17F "Fast Woman", 359th Bomb. Squadron, 303rd Bomb. Group, 8th Air Force. Bases, Molesworth, U.K., 1942–45; Casablanca, French Morocco, May–July, 1945.





B-17F, 365th Bomb. Squadron (code KY—), 305th Bomb Group, 8th Air Force. Bases, Grafton Underwood and Chelveston, U.K., 1942–45.

B-17F "Little America", 544th Bomb. Squadron, 384th Bomb. Group, 8th Air Force. Bases, Grafton Underwood, U.K., 1943–45; Istres, France, June 1945–28th February 1946.

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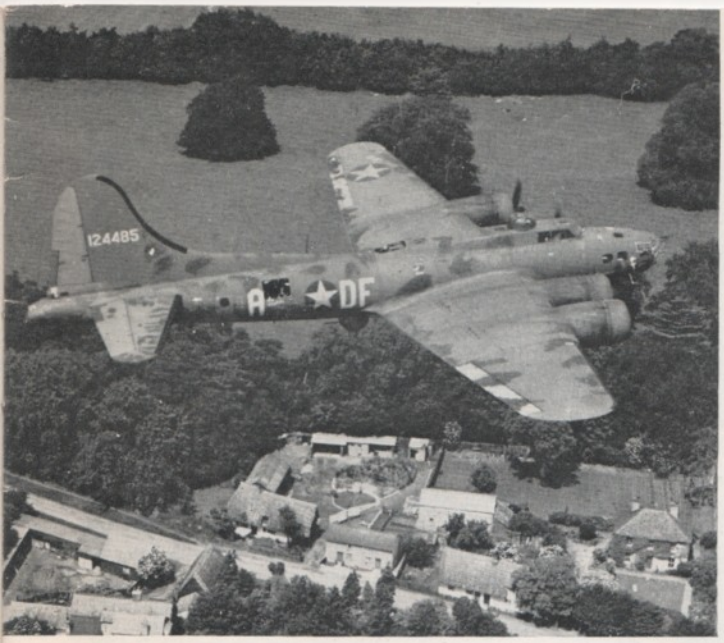


The Boeing B-17E & F Flying Fortress

by Charles D. Thompson

The Boeing B-17 aircraft series was a strange mixture of brilliant design work, dogmatic misuse, aerodynamic honesty, adaptability, myth, bravery, and luck, seasoned by wartime propaganda into a soufflé greatness. As is the case with all "pilot's aeroplanes", her docility endeared her to her crews and tended to overshadow her faults; but despite her many design and tactical faults, the B-17 emerged as truly a giant among aircraft, in every sense of the word.

Any aeroplane is only as good as the men who build her. The B-17 was fortunate indeed in her creators, the Boeing Company, who as one of America's pioneer aviation concerns had produced some thirty-nine different designs in the company's eighteen-year life prior to the B-17's debut in 1934. Many were notable trend-setters, and some were revolutionary. Among these earlier designs had been the PW-9 and FB-series fighters for the U.S. Army and Navy; the U.S. Post Office's Model 40; the elegant little F4B/P-12 fighter series; the revolutionary B-9 high speed bomber; the classic P-26; and the B-17's ancestor, the XB-15. With such a comprehensive list of forebears, the B-17 had to be good; Boeing's name had been a synonym for quality for nearly two decades.

Conceived as a defensive weapon comparable to a flying coastal artillery battery, the B-17 was to be called upon to test a rather dogmatic offensive theory of unescorted daylight precision bombing. Originally advanced by the Italian General Douhet, this theory rested essentially on the proposition that a fast, well-armed bomber flying at very high altitude could fight its way in broad daylight through and over any number of defending interceptors to destroy targets at will. (The name "Flying Fortress" did not arise from the aircraft's fabled invulnerability, but rather from the original defensive conception, so quickly forgotten when American tacticians subscribed to Douhet's theory.) The B-17 seemed tailor-made to be the instrument of this new concept of strategic bombardment; and she became the symbol, and at first the only concrete expression, of daylight precision bombing.

It was on 28th June 1935 that the prototype, *X13372*, was rolled out for the first time; on 28th July she made her first flight, and from that date until her untimely end two months later the prototype participated in many test flights. An attempted take-off with gust locks engaged ended the career of *X13372* at Wright Field and cost test pilots Hill and Tower their lives. There were only a few points of difference between *X13372* and the thirteen XB-17s constructed for service tests and assigned to the 2nd Bomb. Group for evaluation. Long-range navigation was a major aspect of this programme, and in this field the early Fortresses recorded several remarkable performances. They won the 1938 Mackay Trophy for a formation flight between Langley Field and South America. The one structural test airframe, designated B-17A, set a load/speed record for 1,000 km., and a load/altitude record.

A 1937 contract called for a batch of thirty-nine machines with more powerful engines providing even higher speed and altitude figures; and although the first B-17B was not delivered until July 1939, it immediately set a new transcontinental speed record. The B-17C requirement called for further engine refinements and cleaned-up gun emplacements. The -C variant was the fastest of all previous *or subsequent* B-17 models; and England's need for combat aircraft caused the diversion of large numbers of B-17Cs to the Royal Air Force, under the designation Fortress I, the first arriving in March 1941. R.A.F. Bomber Command and Coastal Command began operations with the type in June 1941, and for a short time the Fortress seemed to have her own way in the cold substratosphere over Europe; but it was soon made painfully apparent that the *Luftwaffe* had high altitude capability as well. Mechanical problems appeared daily, and after many attempts to improve the situation, the R.A.F. dropped the Fortress from first-line operations altogether. Reports of these problems filtered back to Boeing; vulnerability to gunfire, a tendency to burn easily, icing problems, oxygen

Heading photograph shows the "Memphis Belle", B-17F-10-BO serial number 41-24485, photographed before her return to the U.S.A. after completing twenty-five operational missions from England. Despite numerous hits from flak and fighter cannon-fire, only one crew member, the tail gunner, was wounded during the tour. The "Belle" was the subject of the sixth War Bond Drive, and her last mission was filmed in colour as a feature documentary. Note blotching effect of Medium Green on Olive Drab paint scheme. (Photo: U.S.A.F.)

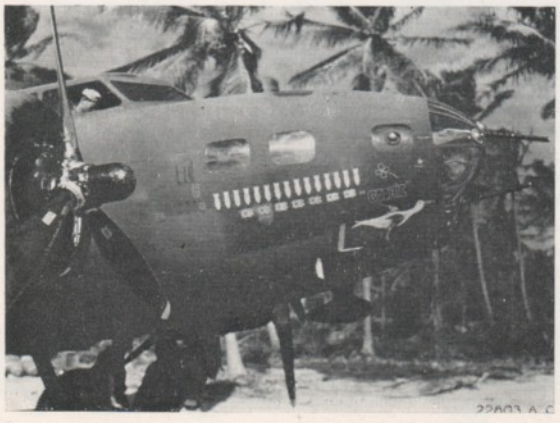
B-17F-30-BO "Delta Rebel" of the 322nd B.S., 91st B.G. en route for the Reich. This was the Fortress in which the late actor Clark Gable flew a mission as observer. (Photo: U.S.A.F.)

system failures, crew fatigue from high altitude operations, and a subsequent general distrust of the type. Boeing's efforts to rectify these problems resulted in the B-17D, with self-sealing fuel tanks, additional armour, engine nacelle cowl flaps, and two extra ·30 calibre machine guns.

All remaining -C models were brought up to -D standard, but the first few days after the attack on Pearl Harbour saw many lost to enemy action and attrition. The surviving B-17Ds were evacuated to Australia and the Java area for regrouping; many were the subjects of a field modification which provided a ·50 calibre machine gun in the tail cone to supplement rear armament. However, further complaints from units in the Pacific theatre, when examined in conjunction with R.A.F. reports, made it painfully obvious that more than modifications were needed to make a realistic combat aircraft out of the B-17. Something drastic had to be done to both the aircraft and the mission concept; the first requirement was met quickly, the second, unfortunately, not for many months.

This photo of the B-17E "Avenger" shows to good effect the greenhouse nose peculiar to this variant. (Photo: U.S.A.F.)

B-17E "Goonie" of the 7th B.G., Pacific Theatre, 1942. The battle star on the nose is marked "Midway". (Photo: U.S.A.F.)



THE FORTRESS REDESIGNED

The first version of the ultimate series was the B-17E, which was more of a 30% re-design than a new variant. A new empennage and rear fuselage were the most obvious changes; also provided were two-gun power turrets in dorsal and ventral positions, a new twin-gun tail position, ·50 calibre guns in all positions except the nose, extensive armour plating, simplified waist emplacements, and numerous smaller internal improvements. Production was initiated without interruption, the first B-17E serving as the prototype and flying on 5th September 1941. (Although production lines were being set up at this time by Vega and Douglas, they were to produce no E-models.)

The B-17E was first delivered to combat units of the 7th Air Force in early February 1942, and the type made its first combat raid on 2nd April over the Andaman Islands. Shipping attacks were carried out by units of the 5th Air Force (from Australia) and the 7th Air Force (from India) in the Philippines some ten days later; and the B-17E was also active during the Battles of Midway and the Coral Sea.

The first 8th Air Force units arrived in Great Britain on 12th May 1942 to "set up house" and to prepare for the coming campaign of unescorted daylight precision bombing. Despite warnings from the combat-experienced R.A.F. authorities, the 8th Air Force Staff began training. The first raid was launched by eighteen B-17Es of the 97th Bomb. Group on 17th August, against Rouen. Twelve machines made the actual assault, the remaining six performing a diversionary sweep up the coast. Subsequent attacks on coastal targets were more in the nature of operational training flights than serious attempts to damage the enemy, and were not forcefully challenged by the *Luftwaffe*. The 8th A.F. Staff grew more secure in its convictions.

On 20th September 1942 the famous General Jimmy Doolittle formed the nucleus of the 12th Air Force in England, and early in October the 97th, 99th, 301st and 2nd Bomb. Groups were transferred to the new formation. The 8th A.F.'s "muscle" was needed for the North African campaign of November.

THE B-17F JOINS BATTLE

The last B-17E rolled off the line on 28th May 1942, and only two days later the first production model of

a new version was rolled out, tested and delivered. Although it incorporated over 400 changes from its predecessor's specification, the -F variant could be distinguished externally from the -E only by its single-piece blown transparent nose. The changes, however, were extremely important. A new ball turret, external bomb racks, paddle-blade propellers, an improved oxygen system, carburettor intake dust filters, stronger landing gear, dual brake system, more photographic equipment, an electronic link between the autopilot and the Norden bombsight, additional ball-and-socket machine gun mounts in the nose; all these combined with Wright R1820–97 engines in place of R1820–60s, added fuel capacity and an improved gross weight and payload performance to make the -F model a considerably more sophisticated fighting aeroplane. No prototype of the -F was built, the first production model being processed in one day, as stated above. The Vega and Douglas lines were put into operation and in the next fifteen months 2,400 B-17Fs were produced.

The initial assault by American forces on the German homeland was a raid on the 27th January 1943 against the port of Wilhelmshaven, carried out by a force of B-17Fs drawn from the 91st, 303rd, 305th and 306th Bomb. Groups; simultaneously, two lonely B-17Fs made a nuisance raid on Emden. "Milk Runs" were the order for February, due to bad weather; but March came in like a lamb, and with it the legendary P-47 Thunderbolt. The "Jug" made its debut in a fighter sweep off Holland; at last, effective there-and-back escort for the bombers was possible.

The 18th March saw first use of Automatic Flight Control over Vegesak. The *Luftwaffe* put up a determined resistance to the raid, but at this stage a certain lack of co-ordination dulled the edge of their attacks; a state of affairs which was not to last, as the 8th A.F. would learn to their cost. Other notable raids in this period were upon the Renault works at Billancourt, the Focke-Wulf plant at Bremen, Kiel, Antwerp, Courtrai, Ijmuiden, Heroya, Trondheim, and Kassel.

These seven months of operations were but a prologue; for in August, in co-operation with R.A.F. Bomber Command, the 8th A.F. was to embark upon a task which almost ended unescorted daylight raids. On 17th August, in a simultaneous daylight attack upon the ball-bearing and aircraft industries at Schweinfurt and Regensburg, the 8th A.F. lost sixty aircraft to enemy action, with further heavy losses in immediate strength through combat damage and attrition. The Regensburg force proceeded to North African bases, and after licking its wounds returned to England via the Focke-Wulf works at Bordeaux. Losses from this raid brought the week's losses to over

Clark Gable poses with the crew of "Delta Rebel".
(Photo: W. J. Connell collection)

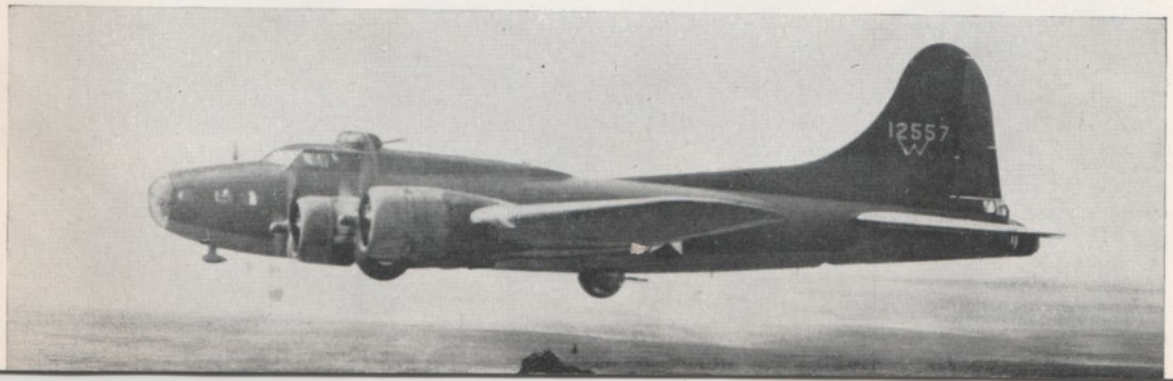
The pilot of "Delta Rebel No. 2" awards his aircraft the D.F.C.
(Photo: W. J. Connell collection)

100 B-17s; another week of comparable casualties, and the 8th Air Force would have ceased to exist. The *Luftwaffe* had found the formula.

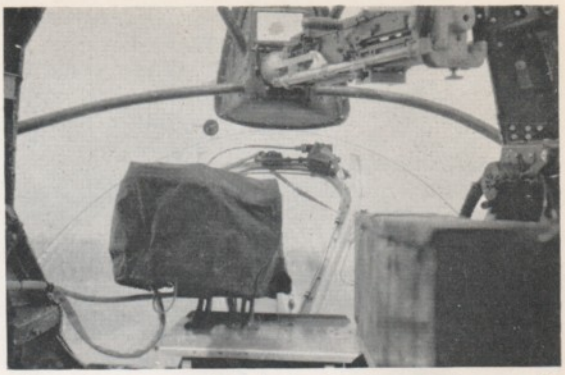
Attacks in September were, of necessity, weak, and the 8th A.F. picked its targets carefully. Bad-weather "through-the-overcast" techniques were used under conditions so bad that interceptors could not operate. Night attacks were made on Billancourt, Chartres, and the Paris area. By October, sufficient replacements of crews and aircraft were available to mount once more an all-out offensive. "Big Week" saw attacks on Anklam, Marienburg and Gdynia in Poland; and the climax of the week was a continuation on 14th October of the 8th A.F.'s "private war" against Schweinfurt, in what was probably the most bloody and savage air battle in history. Sixty Fortresses fell to flak and to the guns of the recklessly brave *Luftwaffe*

A 5th B.G. B-17E on SeaSearch duties over the Pacific.

(Photo: U.S.A.F.)



Messerschmitt's eye-view of a B-17F radio-operator's ·50 cal. gun in the O-type mounting. (Photo: W. J. Connell collection)



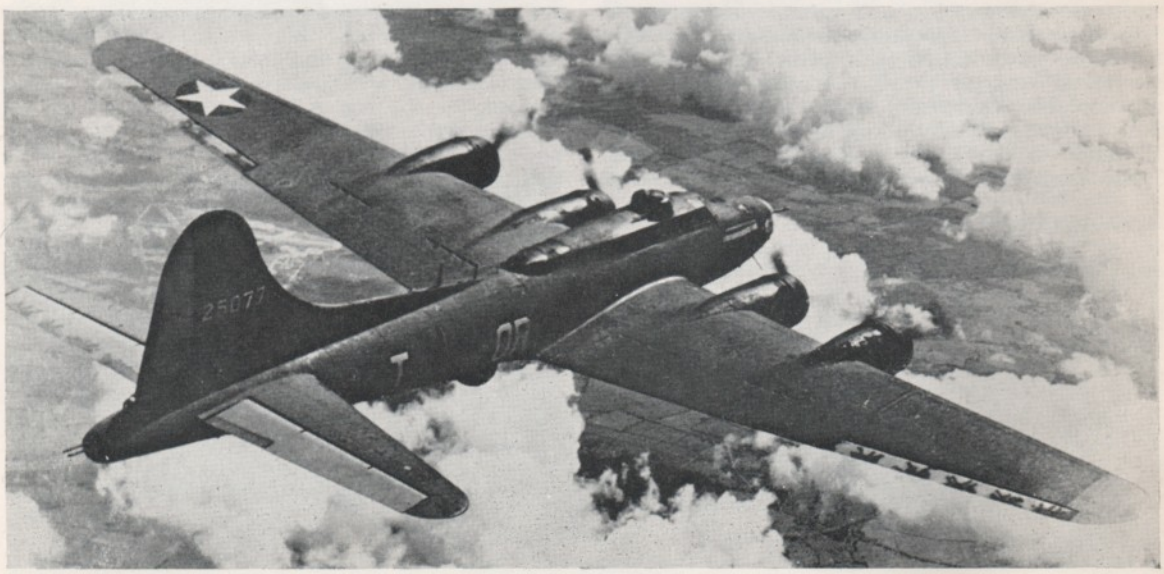
Navigator's eye-view of the single ·50 cal. gun in the nose of a B-17F. In this case the installation appears to be a factory-supplied kit rather than a field modification. Note shrouded Norden bombsight. (Photo: W. J. Connell collection)

fighter pilots. An untold number were damaged so badly as to be permanently removed from service. The 305th B.G. based at Chelveston lost thirteen out of the sixteen aircraft dispatched. Total losses for the week, combined with the time needed to repair the 200 damaged machines, morale factors and the demands of replacement training cost the 8th A.F. almost two full months before in-strength attacks were again possible. By this time the battered -F model was being phased out of first-line operations in favour of the B-17G, and relegated to various second-line duties such as training. As the -G began to take the strain, the P-51 Mustang became available in sufficient quantities to make its presence felt. A new era in the European air war was dawning.

COMBAT SUMMARY

In retrospect, it is greatly to the credit of the 8th Air Force crews that in spite of extreme losses the B-17Fs were never turned back from a raid. They made many determined attempts to vindicate the tacticians' theory of the unescorted day bomber's relative invulnerability; but even with the heaviest defensive battery ever provided for a bomber the B-17F was unable to gain the necessary air superiority over Germany. Failure may appear to be the lot of the B-17E and -F; but in all justice it must be stated that it was not the aircraft which failed the theory, but rather the theory which demanded more than any contemporary aircraft could have delivered. There were solid technical reasons for the B-17's vulnerability. Its tendency to take fire was never cured, and even its great inherent strength could not withstand the flames. The much-publicised defensive weakness in the nose when subjected to frontal attack by fighters was not so great a factor as some writers would have one believe. The ventral, or ball turret could be brought to bear on attacks from low front; the dorsal turret upon level or high frontal attacks; and the nose guns (up to five in number and of heavy calibre) while limited in individual arcs of fire, should have provided sufficient concentrated firepower. The startling truth is that it was not defensive power that was lacking, but protection; of the Fortress's twenty-seven pieces of heavy armour plate and numerous flak curtains, *not one* was positioned to protect the crew from frontal attack. When hit from the front by machine gun and light or heavy cannon fire, the crew of the B-17 was, effectively speaking, naked.

"Delta Rebel" in flight over England. Note Medium Green blotching on control surfaces. (Photo: W. J. Connell collection)



THE PACIFIC THEATRE

Only five Bombardment Groups employing the B-17 drew assignment in the Pacific Theatre. After using B-17s during the Philippine and Java operations, the 7th B.G. moved to India and retrained on B-24s. The 19th B.G. took a serious beating at Clark Field on the 8th December 1941, and after hastily regrouping found operations over the Philippines too costly to continue. The Group's ground personnel were transferred to the ground forces and most were killed or wounded, while the air echelon evacuated to Australia where they participated in the Netherlands Indies, Java and Coral Sea operations before returning to the Z.I. late in 1942. The 5th B.G. carried out Sea-Search duties from Hawaii, and were transferred thence to the S.W. Pacific in time to participate in the drive from the Solomons back to the Philippines, using both B-17s and B-24s.

The 11th and 43rd B.G.'s careers closely paralleled that of the 5th, but they retrained completely on B-24s early in 1943. This trend was due to the B-24's better speed and bomb-load at medium altitudes; also, the losses in Europe were reaching such magnitude that the production was needed for replacements and training in that theatre.

THE MEDITERRANEAN THEATRE

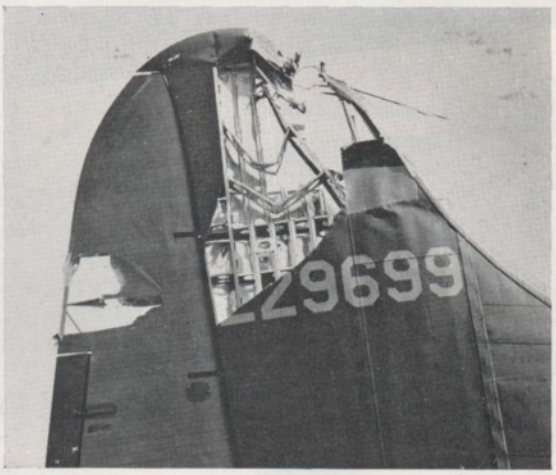
The brunt of the theatre's bombing operations was borne by the B-24 Liberator, although a few B-17 Groups were employed. The four B.G.s spirited away from the 8th A.F. participated in the Tunisian Bizerta and Kasserine Pass battles. The 68th Reconnaissance Group used B-17Fs equipped with electronic counter-measure apparatus alongside their tactical fighter complement. When the war moved northwards, the 12th A.F. B-17s took part in the 28th June raid on Messina, the 5th and 8th September Naples raids, the operations against the *Wehrmacht* counter-attack at Salerno between 13th and 18th September, and the 24th October raid on Wiener Neustadt. By the end of the year the 15th A.F. establishment consisted primarily of B-17G types.

THE FORTRESS DESCRIBED

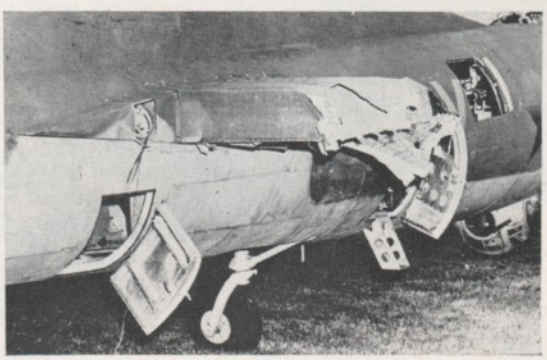
There are many ways to judge a bomber aircraft: speed, bomb load/range factors, defensive ability, ability to absorb combat damage, aerodynamic honesty, versatility, handling ease, speed and ease of maintenance and battle damage repair; and in all these respects the B-17E and -F ranked high. Pilots liked the Fortress; they trusted her, for she was completely predictable. Landing speed at normal landing weight was low, an amazing 73 m.p.h.; and two-engine landings were possible without too much drama. Formation flying is never easy, but the Fort took to it much more willingly than the B-24 or even the B-29 Superfortress. Anybody who has had the privilege of seeing a B-17 do a "buzz job" will testify to the apparent lightness of handling. A brief tour of the internal layout of the B-17 reveals the rather Spartan conditions under which Fortress crews existed. The bombardier's "greenhouse" offered magnificent visibility and was reasonably warm; a crawl back past the navigator's position and upwards leads to the flight deck, with side-by-side seats for pilot and co-pilot. Directly behind them and above is the top turret, usually manned by the flight engineer; the miniscule "bicycle seat" must have been uncomfortable in the extreme to a big man in flying gear, but the turret does provide excellent all-round vision. Moving aft from the turret one has to negotiate a door apparently designed with Greek gods in mind—a V-shaped aperture, none too large in the first place. This affords albeit awkward access to the bomb-bay, which is traversed by a narrow catwalk with precarious rope grab-handles. The aft exit door is conventional in shape, but small; it leads to the radio room, the only place in a Fort where a six-footer can stand erect,

(continued on page 10)

Battle damage 1: this Fortress returned to base safely after a burning wing tank had destroyed 30% of the wing root.
(Photo: W. J. Connell collection)



Battle damage 2: this B-17F-65-BO of the 91st B.G. came home with her fin wrecked by Luftwaffe *aerial bombing. The practice of dropping bombs to break up Fortress formations is believed to have been pioneered in August 1943 by the* Staffelkapitän *of the crack* 5th Staffel, Jagdgeschwader 1, *Oblt. Heinz Knocke.*
(Photo: W. J. Connell collection)



Battle damage 3: a bomb from a Fortress in a higher-flying Group knocked the starboard stabiliser and elevator off this B-17 over the target. She was repaired and put back into service. Note tail gunner's hatch. (Photo: W. J. Connell collection)

© P. ENDSLEIGH CASTLE ARAeS

Below starboard waist gun position.

Below starboard radio compartment window.

MOM

Between and below top turret guns.

124485

DF A

Stylised "S" below port waist gun position.

CINDY

Below nose.

10' 20'

BOEING B-17F-10-BO FLYING FORTRESS of the 324th Bombardment Squadron, 91st Bombardment Group, 1st Combat Wing, 1st Air Division, United States 8th Air Force. Bassingbourn, Cambridgeshire, England. 7th June 1943.

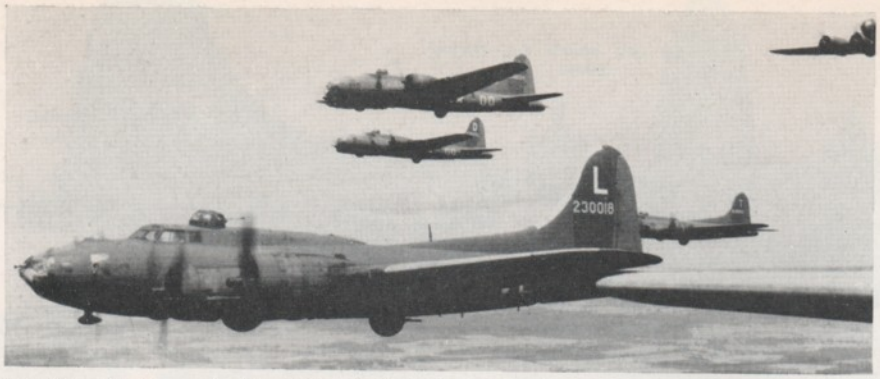
"Memphis Belle" was the first 8th Air Force bomber to complete an operational tour of 25 combat missions and return to the U.S.

"MEMPHIS BELLE"

Note blue swimsuit port side, red swimsuit starboard side.

Crew members names are lettered adjacent to fuselage aft entry door and individually under windows at crew stations:

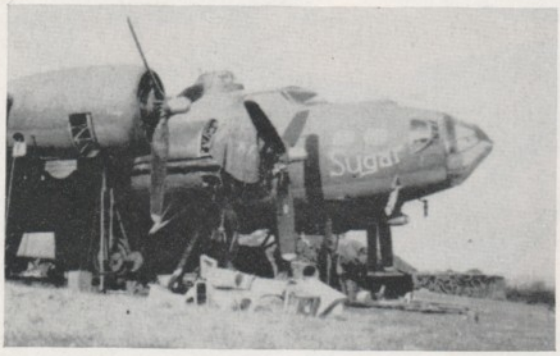
Pilot:	Capt. Robert K. Morgan
Co-pilot:	Capt. James A. Verinis
Bombardier:	Capt. Vincent B. Evans
Navigator:	Capt. Charles B. Leighton
Radio operator:	T./Sgt. Robert J. Hanson
Top turret gunner:	T./Sgt. Harold P. Loch
Ball turret gunner:	S./Sgt. Cecil H. Scott
Waist gunners:	S./Sgt. Clarence E. Winchell
	S./Sgt. Casimer A. Nastal
Tail gunner:	S./Sgt. John P. Quinlan



B-17F-80-BOs serials 42-30018, /15 and /25 in formation with B-17F-85-BO serial 42-30032 of the 532nd B.S., 381st BG., 8th Air Force.
(Photo: U.S.A.F.)

brightly lit through the big skylight/gun hatch. Through the rear door lies the tail section, with the big ball turret hanging in its gimbals; a narrow catwalk leads down the centre of the fuselage to the waist-gun windows, with two smaller walk-ways higher on the cabin sides for the waist gunners. With the top hatch open, the radio room was breezy; but the temperature in the tail section, with its yawning side-ports, made the provision of points for electrically heated flying suits an absolute necessity. High-altitude operations in winter were a waist-gunner's nightmare, with hurricane winds clawing through the gun-ports. Leaving the waist, one moves aft down a rapidly-tapering fuselage, and a kneeling posture is necessary to negotiate the tail wheel well cover safely. A further short crawl ends in the tail gunner's position; a tiny plexiglass cage, where perhaps the most vital gunner in a Fort's crew fought a cramped war from a bicycle seat and padded knee supports. All the draught from the waist positions seems to sweep through into the tail position, and the endurance of the kneeling warriors on long, cold trips over Germany is worth a moment's admiring memory. The mildest comment one can make on crew comfort is that the farther one moves from "officers' country", the colder it gets!

There are three ways to enter a B-17; the nose hatch, located lower left; the main door just forward of the right horizontal stabiliser; and the tail gunner's escape hatch under the right elevator. In Hollywood epics the hero always enters by the nose hatch, jumping from the ground and performing an indescribable wriggle to enter feet first. If the reader had ever tried this manœuvre in forty pounds of leather and fleece flying clothing, he would follow the example of most Fort crews and enter by the main door. It is said that by the twenty-fifth mission of a



Left: "*Sugar*", *a late model B-17F, displays the cheek positions usually associated with the B-17G.* Right: "*The Eagle's Wrath*", *a B-17F-20-BO, serial 41-24524, of the 91st B.G., with twin nose guns. The armour plate covering the bombardier's optical-flat panel is a pointed reminder of the B-17's vulnerability to head-on attack, one of the main reasons for the failure of the Unescorted Daylight Precision Bombing theory.*
(Photos: W. J. Connell collection)

Left: "*I Got Spurs*", *a B-17F-10-BO of the 3rd Reconn. Group, 12th Air Force, based in North Africa; Group Commander was Col. Elliot Roosevelt. Note "dimple" nose transparency and Tri-Metrogon window under nose.* (Photo: U.S.A.F.). Right: *The famous "Piccadilly Commando"; note lack of guns in nose transparency.*
(Photo: W. J. Connell collection)

tour, the tail gunner was so shrunken and withered by the constant cold blast that he could enter his hatch with ease; but it was as well to ensure that no one was checking out elevator movement at the crucial moment.

The last "people-hatch" is the armoured, hinged plate that forms the seat back of the ball turret, and serves as an emergency exit for this foetal gladiator. It could be used as an entrance door only if the gunner wished to stay in the turret during take-off, and with a ground-clearance of only fifteen inches, that took a brave man. The door was only inside the ship when the guns pointed vertically down, a position not possible on the ground.

The B-17, for all its size, was neither luxurious nor roomy. One could stand in the centre and touch both sides in any part of the aircraft. Unlike its successor the B-29, the Fortress sacrificed comfort for efficiency; but it could at least be claimed that no one ever suffered from lack of ventilation in the rear sections.

STRUCTURE OF THE B-17

Fuselage A conventional semi-monocoque all-metal structure of basically circular configuration consisting of four main assemblies bolted together. Major assemblies made up of nine sub-assemblies riveted together into stressed elements. A series of vertical frames and bulkheads with longitudinal stringers and stressed skin provided an exceptionally strong structural unit.

Wings Eighteen sub-assemblies made up an extremely efficient lifting surface with a low weight/strength ratio. Truss-type main spars were capped with sheet metal and gusseted girders. Sections between spars covered with corrugated aluminium sheet and stressed skin riveted to corrugated areas and to the truss-type ribs. The entire structure gave a wing with an exceptional ability to absorb damage without loss of structural integrity. Ailerons were of all-metal structure with fabric covering; the split flaps were of all-metal construction.

Empennage All-metal pressed flanged ribs and stringers covered with riveted aluminium sheeting. Control surfaces all-metal with fabric covering.

Landing Gear Single-strut oleo assembly formed rear portion of drag strut, and wheel combination electrically retracted to bring assembly forward and upward into inboard nacelles. Tyres remained partially exposed to slipstream. Tail wheel oleo shock equipped, fully retractable electrically.

A B-17F-70-BO of the 422nd B.S., 305th B.G., coded XK-O. Note twin nose guns and Group tail marking. (Photo: U.S.A.F.)

VARIATIONS ON A THEME

XB-38—B-17E (41-2401) with Allison V-1710-89 liquid-cooled engines; not produced.

YB-40—B-17F-B0 conversion intended as heavily-armed escort; two additional power turrets in chin and dorsal positions, twin waist gun mounts, additional ammunition rather than bomb load. Saw limited operational service, but as YB-40 was slower than the standard B-17F this necessitated formation slowdown, and plan was dropped.

BQ-7—Converted war-weary B-17Es and B-17Fs stripped of armament and all unnecessary equipment. Packed with explosives, these machines were radio controlled on to targets. Several attacks carried out, but control problems caused alarm and the project, designated Castor, was discontinued.

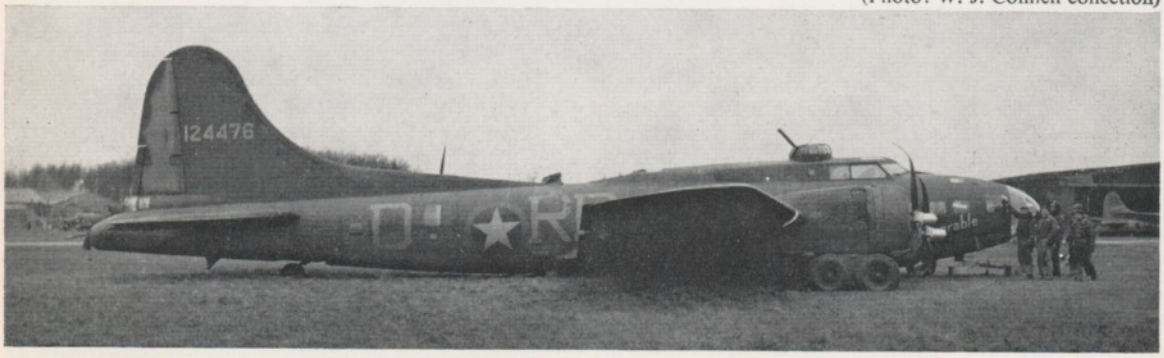
C-108—B-17E-B0s (41-2593 and 41-2595), B-17F-VE (42-6036) and B-17F-B0 (42-30190) were converted for evaluation in VIP, Cargo and Tanker rôles. Gen. Douglas MacArthur used a V.I.P. conversion retaining nose and tail guns.

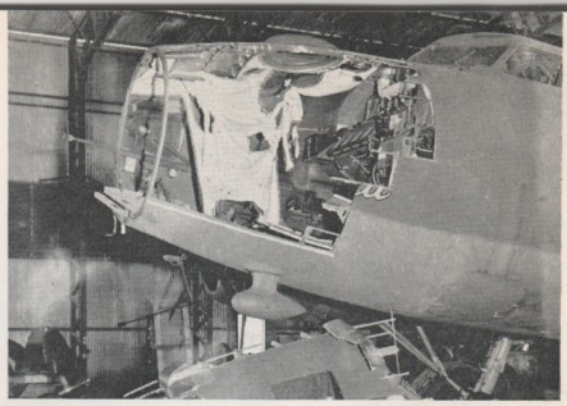
F-9—B-17F aircraft converted and manufactured to fulfil duties of long-range reconnaissance. Six-inch Tri-Metrogon, 12 in. vertical, 24 in. split vertical, and 6 in. oblique camera positions were possible in three versions, the F-9, F-9A and F-9C.

CAMOUFLAGE AND MARKINGS

With B-17E and -F production covering only a year, and operational use being limited to U.S.A.A.C. and R.A.F. units, only two basic schemes apply for the

B-17F-10-BO "Adorable" of the 369th B.S., 306th B.G., after a wheels-up landing. Note yellow surround on cocarde. Swastika flashes show that the ball turret gunner has three confirmed kills, the top turret and starboard waist gunners one each.
(Photo: W. J. Connell collection)





This unusual sequence graphically demonstrates the "repairability" of the Fortress. Top left *shows "Eight Ball", a B-17F-25-DL (DO) of the 91st B.G., serial 42-3138, with nose damage from a runaway propeller. The area to be replaced is marked off with masking tape.* Top right *shows the section removed, with the replacement nose from "Sweet Pea 1st" ready.* Bottom left *shows the section in place.* Bottom right *shows job almost complete.* (Photos: W. J. Connell collection)

former and one for the latter. Basic scheme as delivered consisted of Olive Drab (Shade 41) on all upper surfaces and Neutral Grey (Shade 43) on all under surfaces with the two shades meeting in a four-inch overspray blending. June 1943 saw the addition of Medium Green (Shade 42) specified for use on leading and trailing edges of all flying surfaces in blotches not exceeding 20% of the surface, but not on fuselage surface. However, several E.T.O. Groups applied Medium Green on the fuselage in the form of irregular stripes ending either at the under surface blend or at the wing root.

Markings consisted of cocardes on the fuselage sides midway between the wing trailing edge and the horizontal stabiliser leading edge. Wing cocardes were placed above the port wing and below the starboard wing. Some groups used a yellow surround on the fuselage cocardes. Production covered the specified use of three cocarde styles: blue field with white star; blue field with white star and horizontal bars bordered in red; and blue field with white star and horizontal bars bordered in blue.

Radio call numbers were marked in yellow characters measuring 8 × 12 in. or larger. Many E.T.O.-based Groups used formation code letters in the British style consisting of two letters or one letter and one number serving as a unit designation, with a single letter identifying the individual aircraft. Formation codes were applied in yellow or white paint, three to five feet high. Individual aircraft in combat areas were often emblazoned with names and artwork covering (or uncovering) a broad range of styles, some so bawdy that on one occasion orders were given to "cover up". Petty and Vargas styles were most popular, followed by anti-Nazi and patriotic themes and cartoon characters. Some of the better-known examples are *Southern Comfort, Bat Outa Hell, Quitchurbitchin', Lady Halitosis, Impatient Virgin, Wabbit Twacks, King Malfunction, Berlin Sleeper,* and *Chugalug Lulu.*

R.A.F. Fortresses were used primarily by Coastal Command and were camouflaged in the Temperate Sea scheme of dark slate grey/extra dark sea grey on all plan view surfaces with white under surfaces and fuselage sides. National markings followed standard British practice of the period.

R.A.F. UNITS EQUIPPED WITH B-17E & -F (FORTRESS II & IIA)

Unit	Squadron Code
Coastal Command	
59 Sqdn.	TR
86 Sqdn.	XQ
206 Sqdn.	VX & 2V
220 Sqdn.	ZZ
251 Sqdn. (Met.)	AD
517 Sqdn. (Met.)	X9
519 Sqdn. (Met.)	Z9
521 Sqdn. (Met.)	50
Bomber Command	
214 Sqdn.	BU
223 Sqdn.	6G

With the exception of 223 Sqdn., which saw service in the

B-17E of 97th B.G. displays striped camouflage after that unit's transfer to the 12th A.F. in N. Africa in support of Operation Torch. (Photo: Imperial War Museum)

Mediterranean Theatre, all above units operated from the British Isles.

B-17E & -F SERIALS

B-17 E-BO

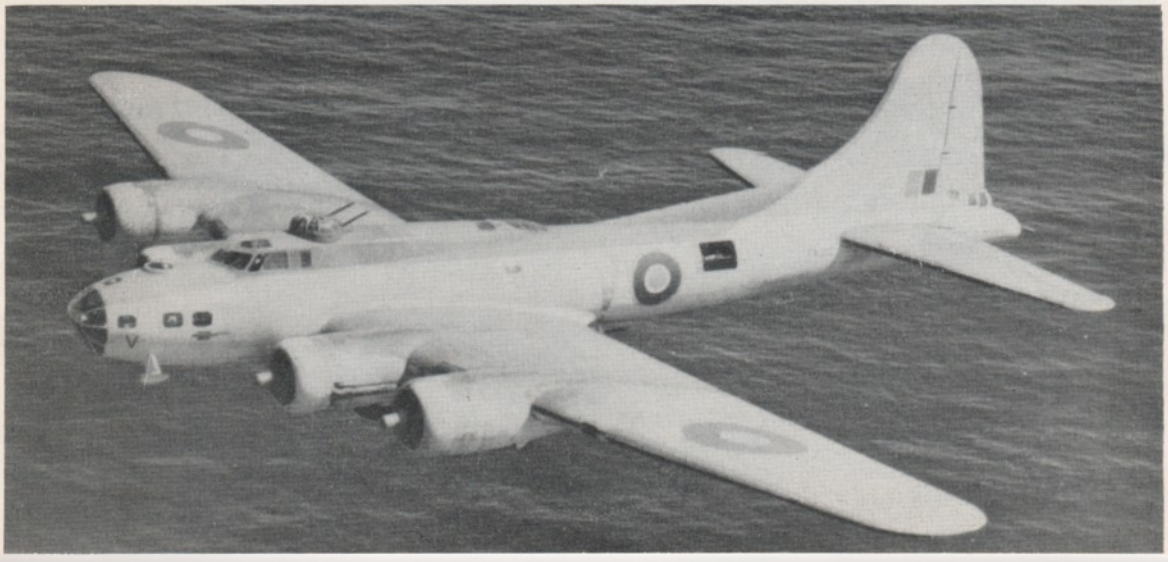
Military Serials	Manufacturer's Serials
41-2393–41-2669	2204–2480
41-9011–41-9245	2493–2717

B-17-F: Boeing Production

Military Serial	Type and Block	Boeing Serial
41-24340–24389	B-17F-1-BO	3025–3074
41-24390–24439	B-17F-5-BO	3075–3124
41-24440–24489	B-17F-10-BO	3125–3174
41-24490–24503	B-17F-15-BO	3175–3188
41-24504–24539	B-17F-20-BO	3189–3224
41-24540–24584	B-17F-25-BO	3225–3269
41-24585–24639	B-17F-27-BO	3270–3324
42-5050–5078	B-17F-30-BO	3589–3617
42-5079–4159	B-17F-35-BO	3618–3688

Nose emblems varied from the extremely simple ("Cased Ace"), through the vulgar ("Down and Go!"), the beautiful ("Elusive Elcy"), and the original ("Dame Satan") to the frankly weird ("The Witche's Tit"). The last-mentioned was a B-17F-50-BO, serial 42-5382 of the 91st B.G. (Photos: W. J. Connell collection)

B-17E (Fortress II) of No. 1435 Fligh , Coastal Command, R.A.F. The R.A.F's major use of the type was on maritime patrol missions. (Photos: Imperial War Museum)



42-5150–5249	B-17F-40-BO	3689–3788
42-5250–5349	B-17F-45-BO	3789–3888
42-5350–5484	B-17F-50-BO	3890–4023
42-29467–29531	B-17F-55-BO	4581–4645
42-29532–28631	B-17F-60-BO	4646–4745
42-29632–29731	B-17F-65-BO	4746–4845
42-29732–29831	B-17F-70-BO	4846–4945
42-29832–29931	B-17F-75-BO	4946–5045
42-29932–30031	B-17F-80-BO	5046–5145
42-30032–30131	B-17F-85-BO	5146–5245
42-30132–30231	B-17F-90-BO	5246–5345
42-30232–30331	B-17F-95-BO	5346–5445
42-30332–30431	B-17F-100-BO	5446–5545
42-30432–30531	B-17F-105-BO	5546–5645
42-30532–30616	B-17F-110-BO	5646–5730
42-30617–30731	B-17F-115-BO	5731–5845
42-30732–30831	B-17F-120-BO	5846–5945
42-30832–30931	B-17F-125-BO	5946–6045
42-30932–31031	B-17F-130-BO	6046–6145

Douglas Production

42-2964–2966	B-17F-1-DL	42-3284–3338	B-17F-45-DL
42-2967–2878	B-17F-5-DL	42-3339–3393	B-17F-50-DL
42-2979–3003	B-17F-10-DL	42-3394–3422	B-17F-55-DL
42-3004–3038	B-17F-15-DL	42-3423–3448	B-17F-60-DL
42-3039–3073	B-17F-20-DL	42-3449–3482	B-17F-65-DL
42-3074–3148	B-17F-25-DL	42-3493–3503	B-17F-70-DL
42-3149–3188	B-17F-30-DL	42-3504–3562	B-17F-75-DL
42-3189–3228	B-17F-35-DL	42-37714–37715	B-17F-80-DL
42-3229–3283	B-17F-40-DL	42-37717–37720	B-17F-85-DL

Vega Production

42-5705–5709	B-17F-1-VE	42-5855–5904	B-17F-30-VE
42-5710–5724	B-17F-5-VE	42-5905–5954	B-17F-35-VE
42-5725–5744	B-17F-10-VE	42-5955–6029	B-17F-40-VE
42-5745–5764	B-17F-15-VE	42-6030–6104	B-17F-45-VE
42-5765–5804	B-17F-20-VE	42-6105–6204	B-17F-50-VE
42-5805–5854	B-17F-25-VE		

A B-17F-25-VE, serial 42-5809, coded LF-D, Squadron and Group unknown. The tail wheel of this Fortress apparently collapsed on landing; note severe damage from cannon and machine gun fire. Bull emblem on tail is captioned Wunhunglo; Ruth *appears by tail gun position,* Ola *under top turret on port side, and* Strato Sam *figure on both sides of fuselage.* Strato Sam's "*balloon*" *reads: "The boys on this ship sure have a lot to learn about shooting dice!"* (Photo: W. J. Connell collection)

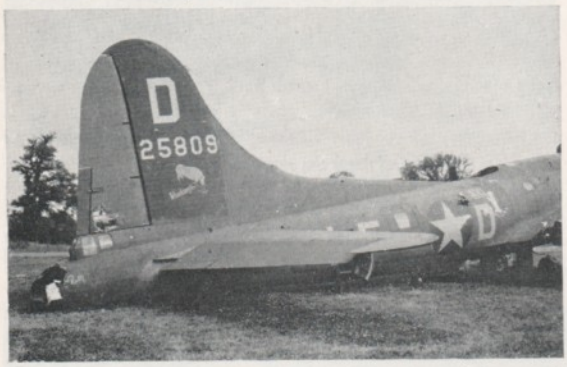


TABLE OF SPECIFICATIONS

B-17F Aeroplane (B-17E specifications shown in parentheses when differing from -F).

Official Description: "Ten-Place Landplane Monoplane, Long Range High Altitude Low Wing Bomber".

Manufacturer's Model Designation: 299-0.

Military Designation: B-17F (B-17E).

Popular Name: Boeing Flying Fortress.

Total Produced: 2,300 (512).

Period of Production: 30th May 1942–2nd September 1943. (5th September 1941–28th May 1942).

First Flight: 30th May 1942 (5th September 1941).

DIMENSIONS AND SPECIFICATIONS

Wing: Span 103 ft. 9·38 in. Area 1,420 gross, 1,277·5 net. Root chord 228 in. Tip chord 106·7 in. Incidence 3½ degrees. Dihedral 4½ degrees. Sweepback 8 degrees 9 minutes. Airfoil NACA 0018 root, NACA 0010 tip. Wing loading 28·3 lb. per sq. ft.

Fuselage: Length 74 ft. 8·9 in. (73 ft. 1·52 in.). Height 19 ft. 2·44 in.

Landing Gear: Tread 21 ft. 1·52 in. Wheel 55 in. diameter. Tail wheel 26 in. solid core.

Powerplant: Type: 4 Wright R1820–97 (R1920–65). Power rating: 1,200 b.h.p. at take-off, 1,000 b.h.p. maximum at 25,000 ft., 2,300 r.p.m.

Propeller: 4 Hamilton Standard Hydramatic, 3 blade of 11 ft. 7 in. diameter.

Fuel Capacity: Normal 2,520 U.S. gallons (2,490 gallons), maximum 3,612 U.S. gallons with Tokyo tanks.

Oil Storage: 147·6 U.S. gallons (180 gallons).

Performance: Speed: Top 325 m.p.h. at 25,000 ft. (318 m.p.h.). Cruise 160 m.p.h. at 5,000 ft. Landing 73 m.p.h. (70 m.p.h.). Range: Maximum 4,420 miles on 3,612 gallons at 5,000 ft. (maximum 3,300 miles on 2,492 gallons at 5,000 ft.).

Weight: Design empty 35,728 lb. (33,279 lb.). Design gross 40,260 lb. (40,260 lb.). Maximum gross 48,720 lb. (48,726 lb.).

Bomb Load: Design bomb load maximums: 26 M30 100-lb. GP (20), or 16 M31 300-lb. GP (14), or 12 M43 500-lb. GP (8), or 8 M44 1,000-lb. GP (4), or 4 M34 2,000-lb. GP (2).

Specified Defensive Armament

Nose Position: 6 Type K-1 ball-and-socket ·30 calibre mounts located in windows and nose. 1 M-2 ·30 calibre Browning machine gun with 5,100 rd. ammo. boxes.

Dorsal Position: 1 Sperry No. 645473E power turret with 2 ·50 calibre M-2 Browning machine guns. 500 rds. per gun. 1 type K-2 ball-and-socket ·50 calibre mount in radio compartment with M-2 ·50 calibre Browning machine gun. 5,100 rd. ammo. boxes.

Ventral Position: 1 Sperry No. 645849-J power turret with 2 ·50 calibre M-2 Browning machine guns. 500 rds. per gun.

Waist Position: 1 ·50 calibre M-2 Browning machine gun in each of the 2 waist windows. 400 rds. per gun.

Tail Position: 2 ·50 calibre M-2 Browning machine guns. 500 rds. per gun. Equipped with remote sight.

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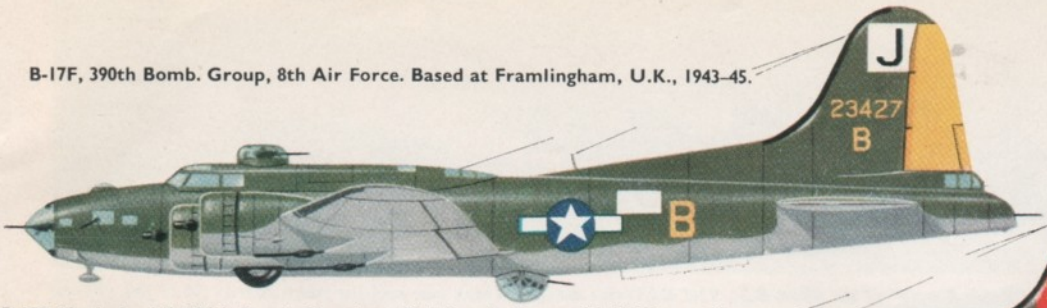
B-17F with external bomb racks in place on a test flight over Mt. Rainier, near Seattle, Washington. (Photo: Boeing)

B-17F, 390th Bomb. Group, 8th Air Force. Based at Framlingham, U.K., 1943–45.

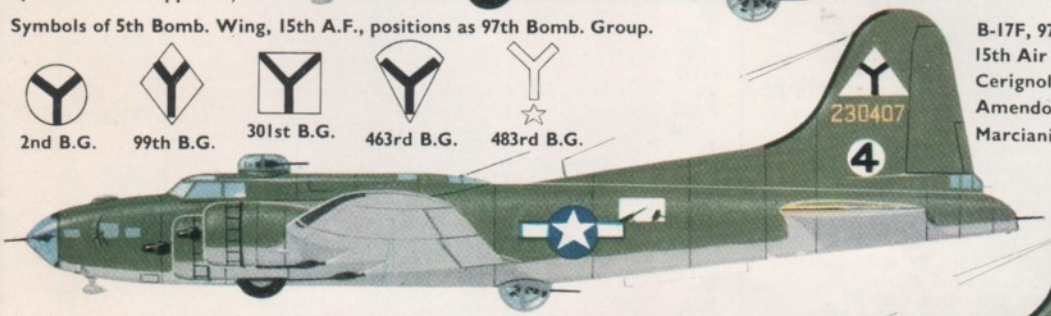


B-17F "Lady Luck", 324th Bomb. Squadron, 91st Bomb. Group, 8th Air Force. Bases, Kimbolton and Bassingbourn, U.K., 1942–45. (Note that this a/c was assigned DF-A code after "Memphis Belle" had completed tour of operations: see pp. 8–9.)

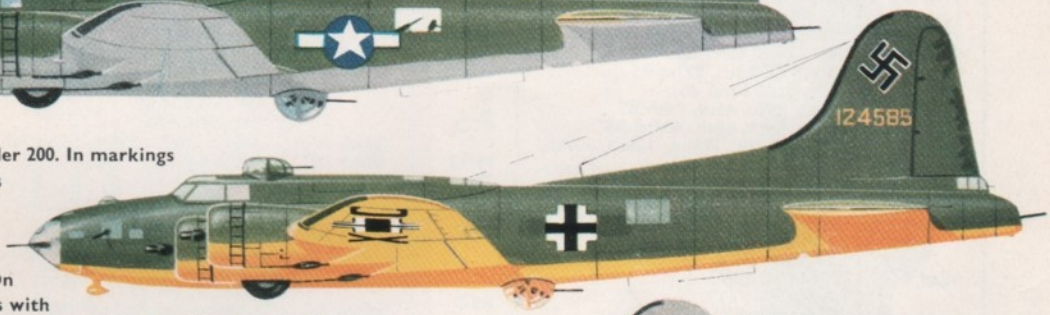
Symbols of 5th Bomb. Wing, 15th A.F., positions as 97th Bomb. Group.

2nd B.G. 99th B.G. 301st B.G. 463rd B.G. 483rd B.G.

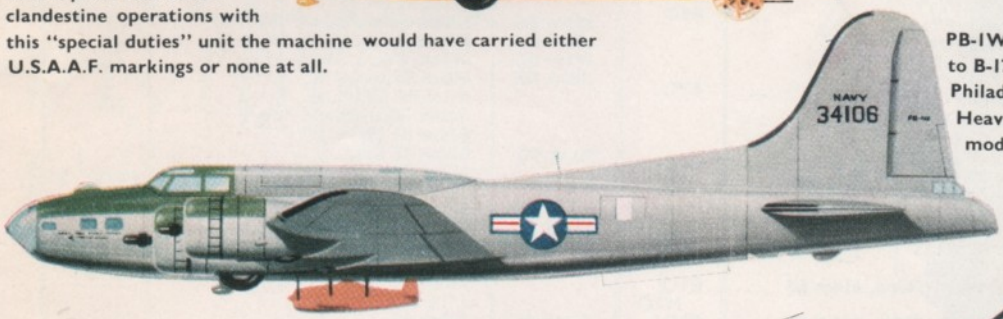
B-17F, 97th Bomb. Group, 15th Air Force, Italy. Bases, Cerignola, December 1943; Amendola, January 1944; Marcianise, October 1945.



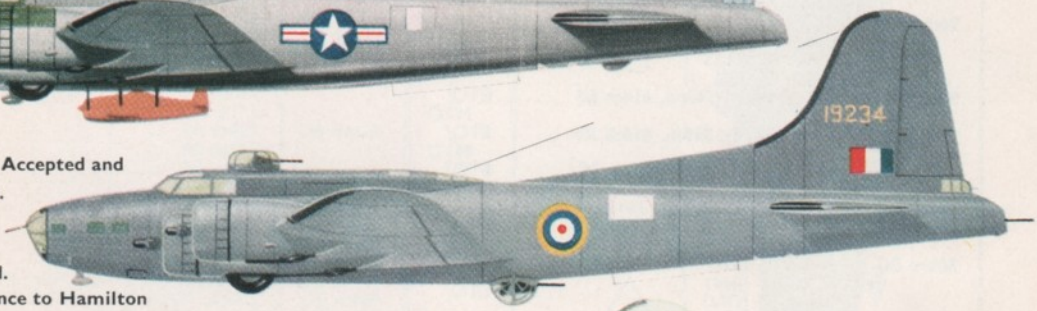
B-17F, Kampfgeschwader 200. In markings illustrated this a/c was probably employed on test flights and evaluation of fighter interception tactics. On clandestine operations with this "special duties" unit the machine would have carried either U.S.A.A.F. markings or none at all.



PB-1W, B-17F partially modified to B-17G standard, N.A.M.C. Philadelphia, U.S. Navy. Heavily weighted F8F Bearcat model carried for drop tests.

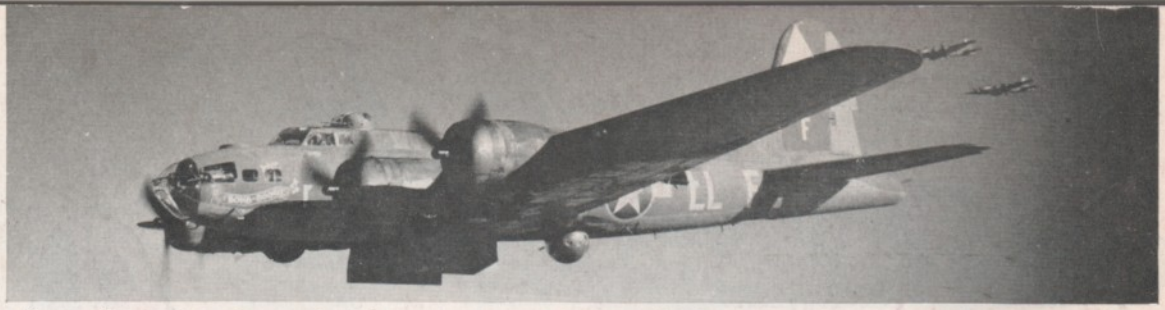


B-17E "mystery ship". Accepted and delivered to U.S.A.A.F. 26th July 1942 (cost $280,135); passed through Cheyenne Mod. Center, Wyoming; thence to Hamilton Field, California, for Project SUMAC, the delivery of a/c to the 5th A.F. At some subsequent date passed to the R.A.F., serial (if any), unit and history unknown. Crashed on mountain north of Blackcat Gap near Wau, New Guinea, where the remains still exist.



Fortress II, No. 1435 Flight, Coastal Command, R.A.F.

© WARD



A late model B-17F "Bomb Boogie" of the 401st B.S., 91st B.G. with modified cheek gun position which allows .50 to fire directly forward. (Photo: U.S.A.F.)

U.S.A.A.C. UNITS EQUIPPED WITH B-17 AIRCRAFT

Abbreviations: BG=Bomb. Group; BS=Bomb. Squadron; SA=Search-Attack Unit; PS=Photo Squadron; RS, RG=Reconnaissance Squadron, Group; ETO=European Theatre of Operations; PTO=Pacific Theatre of Operations; MTO=Mediterranean Theatre of Operations; CBI=China, Burma, India Theatre; ZI=Zone of the Interior, i.e., United States of America. Sqdn. formation codes, where known and verified, are in parentheses for ETO sqdn. Identification symbols are Group tail, etc., markings.

Group	Squadrons	Theatre
1st SAG	2nd, 3rd, 4th SAS	ZI
2nd BG	20th, 49th, 96th, 429th BS ...	MTO
5th BG	23rd, 31st, 72nd, 394th BS ...	PTO
5th RG	21st, 22nd, 23rd, 24th RS ...	MTO
6th BG	3rd, 25th, 74th, 395th, 397th BS	ZI
7th BG	9th, 11th, 22nd, 88th BS	PTO/CBI
9th BG(SA)	1st, 5th, 99th, 430th BS	ZI
9th RG	No sqdns. assigned	ZI
11th BG	26th, 42nd, 98th, 431st BS ...	PTO
11th PG	1st, 3rd, 19th PS	PTO
19th BG	14th, 28th, 30th, 40th, 93rd BS ...	PTO
29th BG	6th, 29th, 52nd BS	ZI
34th BG	4th, 7th, 18th, 391st BS	ZI
39th BG	6th, 61st, 62nd BS...	ZI
40th BG	29th, 44th, 45th, 74th BS... ...	ZI
43rd BG	63rd, 64th, 65th, 403rd BS ...	PTO
68th RG	16th, 111th, 122nd, 125th, 127th, 154th RS	MTO
88th BG	316th, 317th, 318th, 399th BS ...	ZI
91st BG	322nd BS (OR) 323rd BS (LG) 324th BS (DF) [A] ... 401st BS (LL)	ETO
92nd BG	325th BS (JW) 326th BS (NV) 327th BS (PY) [B] ... 407th BS (UX)	ETO
94th BG	331st BS (GL) 332nd BS (QE) 333rd BS (TS) [A] ... 410th BS (XM)	ETO
95th BG	334th BS (BG) 335th BS (ET) 336th BS (OE) [B] ... 412th BS (QW)	ETO
96th BG	337th BS (AW) 338th BS (BX) 339th BS (MZ) [C] ... 413th BS (QJ)	ETO
97th BG	340th, 341st, 342nd, 414th BS ...	ETO/MTO
99th BG	346th, 347th, 348th, 416th BS ...	ETO/MTO
100th BG	349th, 350th, 351st, 418th BS ...	ETO/MTO
301st BG	32nd, 352nd, 353rd, 354th, 419th BS	ETO/MTO
303rd BG	358th BS (VK) 359th BS (BN) 360th BS (GN) [C] ... 427th BS (PU)	ETO
304th BG	361st, 362nd, 363rd, 421st BS ...	ZI
305th BG	364th BS (JJ) 365th BS (KY) 366th BS (WF) [G] ... 422nd BS (XK)	ETO
306th BG	367th BS (BO) 368th BS (GY) 369th BS (RD) [H] ... 423rd BS (WW)	ETO
307th BG	370th, 371st, 372nd, 424th BS ...	ETO
331st BG	461st, 462nd, 463rd, 464th BS ...	ZI
333rd BG	466th, 467th, 468th, 469th BS ...	ZI
346th BG	502nd, 503rd, 504th, 505th BS ...	ZI

Group	Squadrons	Theatre
351st BG	408th BS (DS) 409th BS (RQ) 410th BS (TU) [J] ... 411th BS (YB)	ETO
379th BG	524th BS (FO) 525th BS (FR) 526th BS (LP) [K] ... 527th BS (WA)	ETO
381st BG	532nd BS (VE) 533rd BS (VP) 534th BS (GD) [L] ... 535th BS (MS)	ETO
383rd BG	540th, 541st, 542nd, 543rd BS ...	ZI
384th BG	544th BS (BK) 545th BS (JD) 546th BS (SO) [P] ... 547th BS (SU)	ETO
385th BG	548th, 549th, 550th, 551st BS ...	ETO
388th BG	560th BS ... 561st BS ... 562nd BS ... [H] ... 563rd BS ...	ETO
390th BG	568th BS (BI) 569th BS (CC) 570th BS (DI) [J] ... 571st BS (FC)	ETO
393rd BG	580th, 581st, 582nd, 583rd BS ...	ZI
395th BG	588th, 589th, 590th, 591st BS ...	ZI
396th BG	592nd, 593rd, 594th, 595th BS ...	ZI
398th BG	600th BS (K8) 601st BS (N7) 602nd BS (N8) [W] ... 603rd BS (30)	ETO
401st BG	612th BS (IN) 613th BS (IW) 614th BS (IY) [S] ... 615th BS (SC)	ETO
444th BG	676th, 677th, 678th, 679th BS ...	ZI
447th BG	708th BS ... 709th BS ... 710th BS ... [K] ... 711th BS ...	ETO
452nd BG	728th BS ... 729th BS ... 730th BS ... [L] ... 731st BS ...	ETO
457th BG	748th BS ... 749th BS ... 750th BS ... [U] ... 751st BS ...	ETO
463rd BG	772nd, 773rd, 774th, 775th BS ...	MTO
469th BG	796th, 797th, 798th, 799th BS ...	ZI
482nd BG	812th, 813th, 814th BS	ETO
483rd BG	815th, 816th, 817th, 818th BS ...	MTO
486th BG	832nd BS (H8) 833rd BS (2S) 834th BS (3R) [W] ... 835th BS (4N)	ETO
487th BG	836th BS (RS) 837th BS (3C) 838th BS (3G) [P] ... 839th BS (4F)	ETO
488th BG	840th, 841st, 842nd, 843rd BS ...	ETO
493rd BG	860th, 861st, 862nd, 863rd BS ...	ETO
504th BG	393rd, 398th, 421st, 507th BS ...	ZI
505th BG	482nd, 483rd, 484th, 485th BS ...	ZI

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